THE VETERINARY RECORD

FOUNDED BY WILLIAM HUNTING, F.R.C.V.S., 1888.

No. 21. MAY 22, 1943 Vol. 55.

The Fate of Sulphanilamide in Sheep

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The sulphonamides now occupy a well established position in veterinary therapeutics and their use is widespread. It is, therefore, important that a study should be made of the fate of these compounds in the domestic animals. Bauer and Gunderson (1938), Bazeley *et al.* (1939), Stableforth and Hignett (1942) have published results showing the concentrations of sulphanilamide in the blood after the oral administration of the drug to horses and cows. However, in studying the fate of a drug in the body it is better first of all to administer single doses of the compound by intravenous injection, as it is possible in this way to obtain results uncomplicated by absorption from the alimentary canal which is a very variable process.

It has been shown that sulphanilamide is changed partly into acetylsulphanilamide (Marshall, Cutting and Emerson. 1937a). The acetyl compound has no antibacterial activity (Buttle, Gray and Stephenson, 1936), and is more toxic than free sulphanilamide (Marshall *et al.*, 1938). As the degree of acetylation varies widely between different species, it is most important when treating different species to study carefully this process, otherwise a rational scheme of dosage cannot be arranged. For example, the sulphonamides have been found very useful in treating urinary infections, and as only free sulphonamides possess antibacterial properties it is important that the sulphonamides used as urinary antiseptics should be excreted in the urine of the species under treatment mainly as the free compound.

An attempt has been made to follow the fate of single doses of sulphanilamide and sulphacetamide when given intravenously to sheep. A similar experiment was carried out on a cow using sulphanilamide.

Method.—The solution of sulphanilamide (0·5 per cent.) or sodium sulphacetamide (30 per cent.) in saline was injected intravenously in the animals, which were then placed in suitable metabolism cages. At fixed intervals after the injection blood was taken from the jugular vein and the urine and cage washings collected. The sulphonamides were estimated by the method of Bratton and Marshall (1939), but it was found necessary to modify slightly the procedure given by these authors. For the estimation of total sulphanilamide Bratton and Marshall recommend hydrolysis in a test tube. This invariably gave low recoveries when known amounts of acetylsulphanilamide were treated in this manner, whereas hydrolysis under an air condenser gave excellent recoveries (Table I).

Table I

Recoveries of Acetylated Sulphanilamide from Aqueous Solutions

Uncovered test tubes			Test tubes with condenser		
Added mg/100 c.c.	Found mg/100 c.c.	Error %	Added mg/100 c.c.	Found mg/100 c.c.	Error %
1·00	0·73	26·8	1·00	1·00	0·0
1·00	0·70	29·6	1·00	0·95	5·0
1·00	0·72	28·2	1·00	0·97	3·0
0·40	0·28	30·0	1·00	0·97	3·0
0·16	0·15	6·2	1·00	0·97	3·0
0·16	0·14	12·0	1·00	1·02	2·0
0·16	0·13	19·0	1·00	1·01	1·0

The low recovery in the test tubes not fitted with air condensers was not due to a loss of acetylsulphanilamide, as after hydrolysing for one hour in this way, fitting condensers to the same tubes gave good recoveries. I am unable to suggest any explanation for this. It was also found that sulphacetamide decomposed in acid hydrolysis in such a way as to make it impossible to estimate total sulphacetamide. Estimations of free sulphacetamide were quite satisfactory.

Sulphanilamide in blood.—Fig. 1 shows the concentration of sulphanilamide in the blood at intervals after intravenous injection. It will be seen from this Fig. that, in sheep, most of the sulphanilamide in the blood is present in the free or active form. It was shown by plotting the logarithm of the concentration against time that clearance from the blood was exponential, that is, a constant proportion of the drug is removed in unit time.

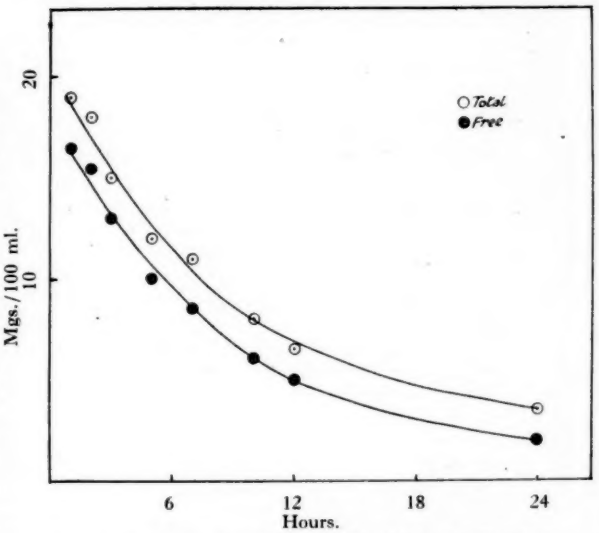

Fig. I.—Concentration of Sulphanilamide in the Blood after Intravenous Injection.

Acetylation.—Since acetylation varies widely between different species and results in decreasing activity and increasing toxicity of the drug it is obviously of great importance. Figures for the percentage of sulphanilamide acetylated by different species are given in Table II. The figures for man and dog were taken from the literature (Fuller, 1937), (Marshall *et al.*, 1937 b), (Taylor *et al.*, 1940). The percentages were calculated from the total amounts of free and total sulphanilamide obtained from the urine by the time excretion was complete. Unfortunately the opportunity has not arisen to repeat the observations on the cow, but the striking nature of the result of the single experiment was considered to justify its inclusion.

Table II

Percentage of Sulphanilamide Acetylated by Different Species

Dog	Mouse	Man	Sheep	Rabbit	Cow
0·0	30	53	62	68	95
0·0	10	51	74	47	
0·0	17	55	34	77	
0·0	25	56	36	40	
0·0	8	58	45	79	
0·0	22	26		70	
	30	21		30	
	40	37		89	
	0	46		92	
	0	41		79	
				54	
0·0	18 ± 4·4	44 ± 4·0	50 ± 7·9	65 ± 6·4	95

Excretion.—As it is possible to recover 50 to 80 per cent. of a single dose of sulphanilamide from the urine, the kidney appears to be the most important organ concerned in the excretion of this drug. It has, however, been shown that a part of the dose given is destroyed or changed in the body into a form not estimated by diazotisation (Alexander, 1943). The fate of this fraction is not known.

Table III shows the percentage of the dose excreted in the urine at various intervals after the injection. Fig. 2 was prepared by

(*Table III and Fig. 2 overleaf.*)

plotting the average results of these experiments. It will be seen from this figure that half of the excretion occurs in the first six hours and is practically complete within 24 hours. However, small quantities of sulphanilamide can be detected in the urine three or four days after a single dose.

TABLE III

Excretion of Sulphanilamide in the Urine.
Percentage of dose excreted.

Time in hours	Free						Total					
1					6·3	4·0					6·6	4·7
3			10·4	3·9	11·0	13·0			14·0	5·0	11·8	16·1
5			13·5	10·1		17·7			18·3	18·1		21·2
6	13·4	10·1				25·5	16·1	25·5				29·5
12					13·5	27·2					13·5	31·1
24	18·4	21·2	23·5	30·1	18·4	38·8	32·2	59·7	50·8	54·9	20·1	53·0
48	20·6	21·3	26·6	32·0			46·0	61·3	38·6	58·9		
72	21·2	21·4					53·6	74·5				
96	21·8		26·8	33·2			55·1		41·7	63·9		
Sheep	I	II	III	IV	V	VI	I	II	III	IV	V	VI

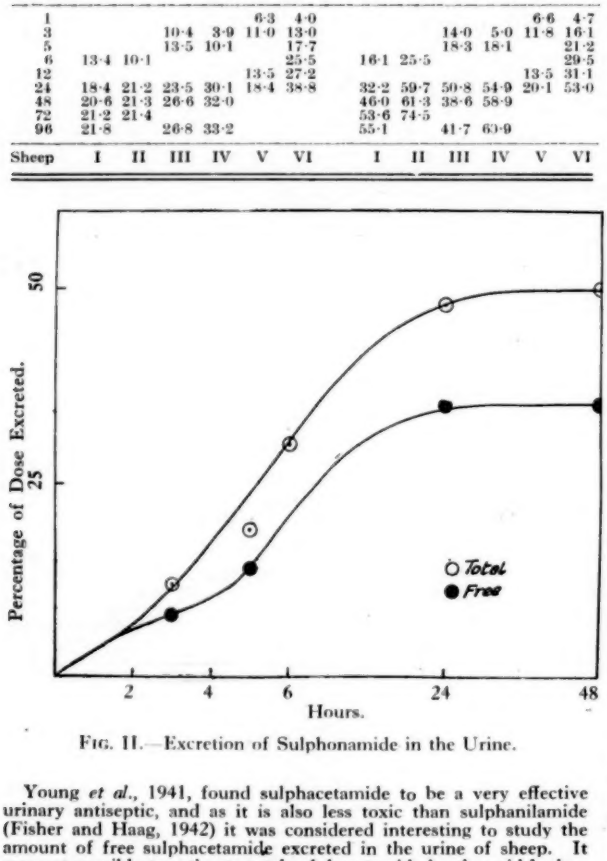

FIG. II.—Excretion of Sulphonamide in the Urine.

Young *et al.*, 1941, found sulphacetamide to be a very effective urinary antiseptic, and as it is also less toxic than sulphanilamide (Fisher and Haag, 1942) it was considered interesting to study the amount of free sulphacetamide excreted in the urine of sheep. It was not possible to estimate total sulphacetamide by the acid hydrolysis method, hence the amount of total drug cannot be given.

Table IV shows the percentage of free sulphanilamide compared with the percentage of free sulphacetamide excreted in the urine 24 hours after intravenous injection. It is interesting to note that sheep receiving doses of sulphanilamide greater than 100 mg./kg. developed a haematuria which persisted for 24 hours. This condition was not produced by comparable doses of sulphacetamide.

TABLE IV

Percentage of Dose Excreted in the Urine as the free Compound 24 hours after Injection.

Expt.	Sulphanilamide	Sulphacetamide
1	22	58
2	21	63
3	27	61
4	30	60
	25 ± 2·12	60·5 ± 0·61

Discussion

The sulphanilamide in sheep's blood, after intravenous injection, is present mainly in the free or active form. It is, therefore, a suitable drug for use in the treatment of diseases caused by sulphonamide susceptible organisms. As the drug is cleared fairly rapidly it is necessary to follow the initial dose with maintenance doses repeated every five or six hours to maintain an adequate concentration of the drug in the blood for an effective time. While it has been assumed previously that the concentration of sulphanilamide is the same in the tissues as in the blood, this does not apply to animals capable of acetylating the compound (Alexander, 1943). The drug was also shown to persist in the liver long after it had disappeared from the blood (*loc. cit.*) and this may be a factor associated with some of the toxic effects of the substance. However, risk of cumulation is greatly reduced by the fact that half the dose is cleared in five or six hours.

Attention has already been drawn to the importance of acetylation in increasing the toxicity and reducing the activity of sulphanilamide. As this process varies widely amongst the different species it is of particular importance to those concerned with animal therapeutics. Acetylation in the domestic animals ranges from the dog which does not acetylate, to the cow which has been found in one case to acetylate the greater part of the sulphanilamide given. This should be borne in mind when treating infections of these species. The sulphonamides are now the most important urinary antiseptics, their value being enhanced by the fact that they are effective in alkaline urine. It seems however, that sulphanilamide is not perhaps the sulphonamide of choice for this purpose in sheep; sulphacetamide is probably more suitable, as a greater fraction of the amount given is excreted unchanged in the urine. The dog appears to be especially suited to sulphonamide therapy as these compounds are not acetylated by this species. However, in treating animals which acetylate sulphonamides it should be remembered that one species may not acetylate one particular member of the series as much as others.

Summary

1. Sulphanilamide in sheep's blood exists mainly in the free form. The drug is cleared exponentially, the time of half clearance being 5 to 6 hours.

2. Sheep acetylate sulphanilamide more than man, mouse or dog, but less than rabbit or in the one cow dealt with.

3. Sheep excrete sulphanilamide mainly in the urine and excretion takes place mostly in the first 24 hours.

4. As more free sulphacetamide than sulphanilamide is excreted in sheep's urine, the former drug is probably the better urinary antiseptic in this species.

Acknowledgments.—I wish to express my indebtedness to the late Professor A. J. Clark, Professor J. H. Gaddum, and Dr. G. A. Levvy, for their help and advice in connection with this work. I should like to thank Dr. J. R. Greig and the staff of the A.D.R.A. for facilities to carry out these experiments, and the Moray Fund of Edinburgh University for certain grants for materials. The work was done during the tenure of a Studentship for Research in Animal Health.

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Weekly Wisdom

Though history is more than "the prolonged shadows of a few great men," this book bears testimony to the enormous influence individuals can exert. One final generalisation of special interest in the present phase of thought may be advanced. Despite Francis Bacon's contention, however closely one investigates and measures, there is always a gap at the end to be jumped by the imagination. By faith Harvey saw the capillaries which Leeuwenhoek, with the aid of his microscope, discovered by sight.—Brit. med. J. 1942. Mar. 14th, p. 361 (from a review of a book entitled "The Development of the Sciences." Second Series. Edited by L. L. Woodruff. London: Oxford Univ. Press, 1941).

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Nearly 10,000 tons of meat and dairy produce have been brought safely to a British port by a ship torpedoed in the North Atlantic and claimed by the German radio as having been sunk. A hole in the vessel 45 ft. by 32 ft. was plugged by a concrete patch, a feat of repair without parallel.

The Treatment of Notoëdres Infections in Golden Hamsters (Cricetus Auratus) with Dimethyl Diphenylene Disulphide (Mitigal) and Tetraethylthiuram Monosulphide

J. D. FULTON, M.B., D.T.M.

Recently Jennings (1942) successfully treated mange in dogs, cattle and a horse with tetraethylthiuram monosulphide. Percival (1942) cured 50 consecutive cases of human scabies with the same substance. Gordon and Seaton (1941, 1942) compared the action of a number of substances on Notoëdres infections in rats and reported favourably on the treatment of the same infection in a hamster by mitigal. So far as the writer is aware, no report has appeared in the literature on the treatment of a series of Golden hamsters naturally infected with Notoëdres.

The burrowing mites of the genus Notoëdres cause mange in various animals, especially cats and rats, and are sometimes responsible for the death of rodents. Man is said to be occasionally infected by parasites of this genus, which differs from Sarcoptes, responsible for scabies in man, chiefly in certain anatomical features. In the Golden hamster the infestation may be very heavy with much scabbing, the disease is resistant, and it shows a great tendency to spread. If it does not prove fatal in this animal, the health at least is adversely affected. The Golden hamster is the most useful laboratory animal available for the study of kala-azar and it is essential for such studies that the animal be in good health.

The infections treated in the present series were naturally acquired and involved ears, snout, feet and perianal region. They varied in character from moderate to severe and in some animals all the regions mentioned were involved. Three animals had scabious masses, the size of a marble, around the anus, and appeared to be in poor health as a result. The hair in the neck region was often absent or of poor quality. Sections of an infected ear showed the presence of numerous mites, larvae and eggs.

Dimethyl diphenylene disulphide $CH_3\ C_6\ H_3 \begin{matrix} S \\ S \end{matrix} C_6\ H_3\ CH_3$ was introduced by Bayer not long after the last war and was used with success in human scabies. Tetraethylthiuram monosulphide $(C_2H_5)_2$ NCS.S.SCN $(C_2H_5)_2$ was first used for the treatment of mange in the U.S.A. a few years ago. A feature common to both drugs is the presence of sulphur atoms in the molecule. Thanks are due to Imperial Chemical Industries, Ltd., for supplying these drugs, the former as an oily substance and the latter as an emulsion of approximately 25 per cent. strength. Each as supplied was made up in 10 per cent. concentration in commercial coconut oil, and solution was aided by gentle heat.

Treatment with mitigal

The affected areas in seven animals with moderate to severe infections were scrubbed with soap and water. As soon as the part was dry the drug was applied with a brush and treatment was repeated on the second, fourth and eighth days. By the eighth day a large scabious mass around the anus of one animal had subsided to normal. scabs in the other affected regions had disappeared and the neck-fur previously absent or of poor quality had started to grow and improve. The animals were kept under observation for several months and remained in good health. No recurrence of infection was noted and signs of skin irritation were absent. It appeared that complete cure had been effected.

Treatment with tetraethylthiuram monosulphide

Seventeen hamsters with infections similar to those in the previous series, including two with scabious masses the size of a marble in the perianal region, were treated with the drug without previous cleansing. Treatment was repeated on the third, sixth and eleventh days. By the sixth day the perianal mass in the two hamsters mentioned had subsided considerably and improvement was thereafter continuous. By the end of treatment all scabs had disappeared and the hair around the affected areas was growing normally. Jennings also noted that the growth of hair appeared to be stimulated by this drug, which is practically odourless and does not irritate the skin. At the end of two months from the start of treatment, when all signs of infection were absent, the ears of the seven most severely infected animals were removed after the hamsters had been killed for another purpose. The ears were fixed in formol saline. Serial sections of each were then made and stained with haematoxylin and eosin. Sections of a normal ear were similarly treated. The ears of the treated animals showed considerable irregularity of outline compared with a normal ear, while the epithelium and interstitial connective tissue showed some hyperplasia and the ears appeared thicker in consequence. The site of the old burrows was recognisable in some cases, but no traces of parasites could be found, in marked contrast to the untreated cases. At the end of three months the remaining animals were still free from infection and it appeared that complete cure had also resulted from treatment with this drug.

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THE VETERINARY RECORD

MAY 22ND, 1943

REPRESENTATION

MUCH is heard, especially during the stress of war, of the principles of representative systems of government, mainly to their advantage. We may be justified in wondering if the two parties to this system, the electors and the elected, always give sufficient thought to their respective responsibilities—severally of elector and elected, and of both to the body they serve. It is not, perhaps, unfair to say that as a nation our apathetic attitude to things political is equalled only by our capacity for retrospective grumbling at what are, often enough, the fruits of that very apathy.

It may be opportune to remind ourselves that, apart from the general representation of the whole profession through members freely elected to the Council of the R.C.V.S., the organisation of the N.V.M.A. furnishes an excellent machinery for the presentation of the majority viewpoint of its members. We refer, of course, to the system by which representatives are elected to serve on Council, N.V.M.A. The geographical representation is fairly distributed, while the ratio of secretary, plus one other representative for every 35 members, or part thereof, of a Division can be regarded as satisfactory. It is true that not all members of the profession or of local Divisions are members of the parent body and that many are members of two, or in some cases more, Divisions and that the Branches are specially represented through their Presidents and Secretaries. This does not, however, seriously invalidate the view that Council, N.V.M.A., is truly representative.

Do we, in fact, make the best use of this position? Whilst it is obvious that those persons chosen by Divisions to act as their representatives to the parent body are regarded by them as individuals who can be trusted to speak and act wisely and well on their behalf, in most cases necessarily without previous mandate, and whom experience has proved to be men of sound and balanced judgment in veterinary affairs, it is desirable to emphasise the aspect that one of the primary duties of a representative is to express the majority view of the group of members represented, especially when topics of major importance are being discussed. Is this function of a representative as the mouthpiece of his electors fully appreciated? As an obvious and important corollary it can be queried whether those who elect make a sufficiently serious attempt to brief those representatives in the opinions they wish presented on their behalf. If they do not, they can have no cause for complaint if a Councillor expresses personal opinions which may be at variance with those of the majority of members he represents.

Not unnaturally the Divisions of the "National" concern themselves largely with matters of scientific interest, but in times such as these, when many matters of great moment to the future of the profession are, or will shortly be, *sub judice*, there is much to commend the policy of local discussion of "political" questions so that those who represent the members on the Council and Committees of the parent body may be enabled to convey, or at the least be cognisant of, the views of the majority.

By making use of the privilege of electing or re-electing representatives once a year, and by assisting as far as possible the proper working of this democratic system within our ranks, we shall do much to obviate the dissemination of rumour and unrest should they arise. Further, active interest and, where possible, participation in the affairs of the profession by those in every sphere of our calling is not only of practical assistance but is an incalculable encouragement to those few upon whom falls the heavy responsibility of attempting to formulate future policy on our behalf.

CLINICAL COMMUNICATIONS

Pasteurellosis Associated with an Outbreak of Husk in a Dairy Herd

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INITIAL CASE.—*History.*—On August 31st, 1942, I was called to see a freshly calved cow which the owner thought to be suffering from heat stroke. The animal belonged to a herd of 28 home-bred dairy Shorthorn cows of average commercial type and quality and in good condition. Losses from Johne's disease have been experienced for several years, but otherwise the health of the herd has been good.

The affected animal showed rapid and very laboured respirations. The temperature was 106° F. and there was dribbling from the mouth and nose, grunting and frequent coughing. Auscultation of the chest wall revealed intense congestion of the lungs with considerable areas of solidification. The calf which was suckling exhibited no symptoms. A diagnosis of an acute pneumonia was made: the prognosis was almost hopeless.

TREATMENT.—125 c.c. prontosil solution was injected intravenously. A mustard plaster was applied to the chest wall. The animal was well rugged up and left in an open shed in the yard. On the following day the condition of the animal was about the same—the temperature was slightly lower. 100 c.c. of a 15 per cent. sulphonamide solution was administered intravenously. Twenty-four hours later a message was received that the cow was dead and that most of the cows were coughing badly.

On arrival at the farm a most alarming state of affairs was found. There was a positive pandemonium of coughing and spluttering from 20 cows. With two exceptions, however, all the cows were feeding. The possibility of an acute outbreak of husk was considered first, but enquiries revealed that the condition had not been seen on the farm for several years.

Post-mortem Examination.—An autopsy was then carried out on the dead cow. A few petechial haemorrhages were observed on the unbroken skin of the flanks and udder. There were numerous subcutaneous haemorrhages. Examination was limited to the thorax and revealed excess pericardial fluid, widespread petechial haemorrhages on the pleura and considerable areas of pleurisy with some adhesions. The lungs were solid, greyish red in colour, waterlogged and had a distinct "marbled" appearance. The lymph glands were enlarged, slightly congested, and very "juicy." Careful search of the bronchi and bronchioles failed to reveal a single husk worm. These findings were considered to be suspicious of haemorrhagic septicaemia, and a portion of lung was forwarded to Dr. A. L. Sheather, who subsequently reported isolating *Pasteurella bovisepticus* in pure culture.

FURTHER CASES.—An examination of the rest of herd showed that the milk yield had dropped 50 per cent. Twenty cows were coughing; eight of these had normal temperatures and twelve showed temperatures ranging from 102·5 to 105° F. Two animals were very ill with acute dyspnoea, some consolidation of the lungs, and inappetence. Auscultation of the lungs of other affected cows revealed exaggerated and rapid lung sounds, but no consolidation. A tentative diagnosis of haemorrhagic septicaemia possibly complicated by husk was made. The diagnosis was difficult to substantiate on the history, as no newcomers had been introduced and, so far as one could ascertain, no departure had been made from the usual routine.

Treatment.—As soon as the laboratory report was received a supply of antiserum was obtained. On September 4th, 50 c.c. serum was administered subcutaneously to twelve animals showing temperatures over 102° F. Within 24 hours several temperatures were down to normal, others were down 1 to 2°, whilst three remained at the previous level. A further 50 c.c. serum was given to those showing pyrexia. At the 48th hour four cows still running temperatures, received 25 c.c. serum. The remainder seemed to be improving, but the coughing was not much abated.

On September 7th, 30 head of young stock comprising down-calving, bulling, and yearling heifers developed a husky cough. Twelve temperatures were taken at random, and as all were normal husk was diagnosed. These animals were treated by intratracheal injection. (I find this treatment useful, in spite of expert opinion to the contrary.)

During the next three weeks the temperatures of affected cows fluctuated considerably. Treatment was confined to the administration of serum, previously treated cases receiving 25 c.c. and fresh cases 50 c.c. By October 2nd there had been several relapses and, in the hope of stimulating an active immunity, an aggressin was obtained. This was administered in 5 c.c. doses to eight cows showing normal temperatures and to three desperate cases. This appeared to have no ill effect, and the remaining cows received 5 c.c. aggressin when their temperatures were normal.

On October 19th a 3-year-old cow *in extremis* was destroyed. *Post-mortem* examination revealed waterlogged lungs packed with husk worm. There was marked emphysema and some consolidation. Dr. Sheather again isolated *P. bovisepticus* from a portion of lung. All the cows were now given intratracheal injections, treatment being repeated in one week.

Of the two original cases showing consolidation of the lungs, one made an uninterrupted recovery, the other improved considerably but then succumbed to Johne's disease. The remainder of the herd made a good recovery, with the exception of one cow. This was the last animal to become affected; she received 150 c.c. serum in four doses, two doses of aggressin and four intratracheal injections. The cough persisted, and her general condition did not improve. She was sent for casualty slaughter in December, and on *post-mortem* examination the lungs were found to be waterlogged, markedly emphysemous, with some areas of "marbled" consolidation and some adhesions to the pleura. Careful search failed to reveal a single husk worm. Unfortunately, no bacteriological examination was made.

During the course of the outbreak the bulk milk yield after an initial drop of 50 per cent. returned in about ten days to within eight gallons of the previous level. The cows were kept in yards for the first week, then turned out as their temperatures returned to normal. Freshly calved animals were the worst affected, while suckling calves remained unaffected.

Discussion.—Until husk was found on *post-mortem* examination, it was impossible to say what was the "trigger" causing the outbreak. It is thought that as husk had not been seen on the farm for a number of years the cows had acquired no age immunity. They were suddenly exposed to a massive infection—possibly from growth of fresh young grass in a heavily contaminated place (although no suspicious place was found). The mass migration of larvae to the lungs acted as a "trigger" to Pasteurella, setting up haemorrhagic septicaemia, and thereafter the husk worms prevented the animals from making a complete recovery, each condition reducing the animals' resistance to the other, and setting up a vicious cycle. In the case of the first death it is thought that pneumonia and death supervened before adult worms appeared in the lungs.

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Congenital Entropion in Lambs

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WELLINGBOROUGH

Of 34 lambs born in a small flock of pedigree Oxford Down, nine were affected at birth with entropion. The ewes concerned came from three widely separated flocks and were of completely different breeding. The first case was not noticed by the farmer until the lamb was three days old, and when a marked conjunctivitis and keratitis had developed, but subsequent cases were noted at birth.

In every case the lower lids only were involved and of nine cases five were bilateral and four unilateral. In three of the unilateral cases by manipulating the eyelid and treating the conjunctivitis a cure was effected, but in four cases surgical measures had to be adopted. The operation produced very satisfactory results; healing was rapid—not being complicated by rubbing as is so often the case in dogs—and the conjunctivitis very quickly cleared up. The remaining two cases were weakly lambs and died shortly after birth.

It is possible that the condition is hereditary and transmitted by the ram. In this connection it is interesting to note that at the time of his purchase the vendor in the course of conversation told the farmer that when the Russians came to buy rams from him they turned down two or three on account of signs of entropion.

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animals were slaughtered at the abattoir, and 1,202 tons of meat were condemned. During the year 196 cattle and 380 pigs were notified to the Secretary of Public Health and to the Agricultural Department as tuberculous, as well as two cases of anthrax. Tick-infested animals numbered 12,104.

The city possessed 1,618 mules, 119 horses and 726 oxen, the health of which was satisfactory. In addition to routine inspection on four farms, *post-mortem* examinations on such farm and municipal animals, there were also 1,860 Zoo animals to be looked after. Despite depletion of the veterinary staff (two left for military service), 130 dairies and 6,283 cows were inspected for udder tuberculosis, etc. Of the conditions found, 151 were indurated udders 122 mastitis (other than tuberculous).

Mr. A. C. Kirkpatrick and his staff are to be congratulated upon a year's interesting work, carried out by a smaller staff under difficult conditions. D. J. A.

ABSTRACTS

[SOME OBSERVATIONS ON THE PATHOLOGY OF PNEUMONIA IN FOOD-PRODUCING ANIMALS. Langham, R. F., Thorpe, F., Ingle, R. T., and Sholl, L. B. (1942.) *Amer. J. vet. Res.* 3. 139-145. (9 refs.).]

This study concerns the bacteriology and pathology of nine bovine, twelve ovine and ten porcine cases of broncho-pneumonia. Beta-haemolytic streptococci (all Lancefield's Group C) were isolated from four bovine, three ovine and four porcine lungs and pasteurella species from eight ovine and four porcine lungs. A diplococcus (Spray, R. S. (1923.) *J. inf. Dis.* **32**. 97-112) was isolated from four sheep lungs and other less commonly found organisms included staphylococci, coliforms, and in pigs corynebacteria and *Salmonella suipestifer*. No pathogenicity studies are mentioned regarding the pasteurella species found.

The pathology of these pneumonias in the three animals was very similar and the cell picture of the various tissues involved is detailed and illustrated. In general the changes were confined to the apical and cardiac lobes, but sometimes all lobes were affected with a patchy pneumonia. In most cases polymorphonuclear leucocytes predominated, but mononuclears were the dominant cells in two cases. The lesions are described in acute, sub-acute and chronic forms of the disease, fibroblastosis being noted in some degree in all but the acute cases. In both sheep and pig lungs there was hyperplasia of the smooth muscle of the walls of the alveoli and a greater tendency to more necrotic foci than in bovine lungs.

C. V. W.

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[AN ANOMALY IN HOG HEARTS: DEFECTUS INTERVENTRICULARIS SEPTI. Meyerowitz, B. (1942.) *Amer. J. vet. Res.* 3. 368.]

Fourteen cases of patency of the interventricular septum in the heart of the hog are described. In each case the foramen was in the upper part of the septum beneath the origin of the aorta and pulmonary artery. The opening into the left ventricle was always immediately below the aortic valve while the opening into the right ventricle varied in position between the pulmonary and tricuspid valves. No details are given of the direction of the long axis of the foramen. The lumen of the foramina varied from $\frac{1}{4}$th to 1 inch. Dilatation and hypertrophy accompanied this condition to a greater or lesser degree depending on the size of the opening and the amount of blood shunted to either side.

The significant feature of these cases was that they were all associated with some other cardiac defect; among those observed were patent foramen ovale, patent ductus arteriosus, abnormalities of the heart valves and aneurysms of the great vessels. [The photographs are rather confusing, as what appears to be the right ventricle is described by the author as the left ventricle.]

C. W. O.

REPORT

[CITY OF JOHANNESBURG. Report of Director of Abattoir and Livestock Market Department, for the period July 1st, 1941, to June 30th, 1942.]

As usual this report is full of interesting material, and the reviewer who looks for "padding" will not find any. The veterinary officers carry out clinical examinations of dairy cows supplying milk to Johannesburg and in order to control animals suspected of being tuberculous, the following regulation was promulgated following representations made to the Director of Veterinary Services:—

> "No person shall, without the written authority of a Government veterinary officer, move out of or from one place to another within the municipal area of Johannesburg any cattle in respect of which the person in charge has been notified in writing by a Government veterinary officer or by a veterinarian in the service of the Municipality of Johannesburg that such cattle are or are suspected to be infected with tuberculosis."

This regulation, made by the Governor-General and published in *The Government Gazette*, prompts a veterinary surgeon in Great Britain to reflect on three points:—

(*a*) South Africa has a "Director of Veterinary Services."
(*b*) South Africa listens to its Director of Veterinary Services.
(*c*) South African Municipal veterinary officers can obtain the ear of the Director of Veterinary Services.

All of which is enough to make British municipal veterinary officers very very sad.

Over two million animals passed through the city open and quarantine markets during the year under review, whilst 1,231,848

(*Concluded at foot of previous column.*)

IN PARLIAMENT

Commons Debate T.T. Milk Position under the Rationalisation of Distribution Scheme, and Pasteurisation

With the Commons in Committee of Supply on the Ministry of Food Vote, on Thursday of last week, following the opening statement on the work of his Department by Mr. Mabane, Parliamentary Secretary to the Ministry, several members took advantage of the occasion to follow up Major York's reference to the question (reported below) which he had addressed to Mr. Mabane on the previous day on the inclusion of tuberculin-tested milk with other grades for the purpose of the distribution rationalisation scheme, with contributions on the subject of pasteurisation.

Tuberculin-Tested Milk

On the former question Major York described Mr. Mabane's answer, that T.T. milk was included in the milk rationalisation scheme and that consumers could not change over from non-T.T. milk to T.T. milk should they want to do so, as a most disturbing feature of the attitude of the Ministry of Food towards T.T. milk. What he and others connected with producers, who thought like him, wanted was to make the Ministers concerned attempt to turn the whole of the nation's milk into a quality equivalent to T.T. milk, the supply of which had never been able to get on top of the demand. The inclusion of tuberculin-tested milk in the rationalisation scheme would restrict both demand and incentive to supply and the drive for quality milk would have a terrific setback. This decision to "freeze" the sales of T.T. milk was not in the interests of the campaign for a clean milk supply.

Mr. Wilfrid Roberts: It was really in the last war when the movement for improving the quality of the milk supply began, and the campaign for tuberculin tested milk arose as a result of the experience during the war. He much regretted that the movement had not been encouraged by the activities of the Ministry of Food and, perhaps, of the Treasury during this war. The two great difficulties against increasing the supply of T.T. milk were the expense of clearing the disease out of the herds and finding the customers for the milk. Those of them who were interested in the permanent welfare of the milk industry regretted that difficulties were put in the way now of increasing the popularity of T.T. milk at a time when there was a growing demand, apparently because customers could now afford the little extra that it cost. The Ministry of Food should reconsider the matter. The testing of cattle had been greatly improved since the early days and, looking forward to peace-time conditions, it would be much less difficult now to do what the United States had done, which was to clear up this disease in a really wholesale way. That, he believed, was really the ultimate solution of this vexed question of pasteurisation. Whether we had pasteurisation or not, from the widest aspect the right thing to do was to clear up tuberculosis in cattle; even if it meant a little greater administrative difficulty during the war, the impediments to that movement should be removed as soon as possible.

Pasteurisation

Mr. David Adams reminded the Committee of the question he had addressed the previous day to the Parliamentary Secretary on the subject of pasteurisation (see below). The answer received was very short. It was that the Parliamentary Secretary was not yet in a position to make a statement upon the matter. But it was now 12 months since his Noble Friend the Minister received what he described as a delegation of extreme weight representative of medical scientific opinion in the country. The Minister promised that deputation that he would give full consideration to their representations. The gravamen of the delegation was to request in the name of the scientific opinion of the country that all milk for human consumption should be pasteurised. The Parliamentary Secretary, in the course of his observations to-day, used the expression "the raw material of the race, the children, should not be put at risk." He was dealing with the question of milk supplies. If the milk supplies of the country were productive of disease in children then that situation refuted his statement that we were protecting the raw material of the race. Milk, Mr. Mabane advised them, had become the prime food of the whole nation: increasing quantities were being consumed. Surely it was a very elementary request for any public representative to make to the Government that that prime food should be pure and should be safe. There was no great difficulty in achieving that.

Efficient pasteurisation of milk was assented to by all medical scientfic opinion in the country, almost without exception, as being a means of destroying the pathogenic infective organisms in milk which produce diseases in consumers. The complaint he made was that there was no Government Department expressly charged with the duty of seeing that our milk supply is pure. There was no

inspectorate of milk production carried through from the producer to the consumer. But the efficient handling of pasteurised milk after pasteurisation was also a matter of prime importance. They had learned with considerable surprise that in London diseases which were known to be milk-borne occurred despite the very general adoption of pasteurisation of milk sold in the Metropolis. That was due to the mishandling of milk which had been properly pasteurised.

The difficulty of securing a safe milk supply from our farms was fairly obvious. It was asserted by experts that 40 per cent. of the cows in the country reacted to the tuberculin test and that one cow in every 200 excreted tubercle bacilli in her milk. The deletion of such animals from our dairy herds would be an interminable process if it were not practically impossible. Control of the human personnel and the provision of a pure water supply on farms, and the destruction of disease-carrying rodents were other factors presenting great difficulty. Veterinary inspection of dairy cows was not carried out regularly and in certain cases not at all. Very few children were safeguarded against the risks of bovine tuberculosis with as rigorous care as calves in certain herds.

It was an interesting commentary upon the work of the Ministry of Food that prior to the introduction of the national milk scheme medical officers of health had the power to reject milk that was found upon bacteriological examination to be unfit for human consumption. After the introduction of the scheme that power was taken away from local authorities, and all that the medical officer of health could now do was to write to the medical officer of the district supplying the milk and ask him to see that the milk was improved. He had no power to enforce his request, and the result was that we foisted upon the people milk which admittedly was full of disease germs, and this affected the health of the children. He spoke with considerable feeling as an ex-chairman of the Health Committee of the Newcastle-upon-Tyne Corporation, because he had seen some of their most healthy children brought from school with milk-borne diseases of the bone, the joint or the glands, never to recover. There was a great incidence of crippled children, once healthy and vigorous, as one of the consequences of drinking milk which was not fit for human consumption.

Pasteurisation would give the nation a pure milk supply, provided that, after pasteurisation, the milk was handled in a scientific and efficient way.

Mr. Tree: There was not the slightest use in trying to improve the health of the nation by asking them to drink more milk unless its quality was guaranteed. Mr. Adams had referred to the incidence of disease in herds, but it included not only tuberculosis but contagious abortion that caused undulant fever in humans, mastitis and so on. His experience in the United States at a time when they were engaged in cleaning up the herds in that particular area led him to think that pasteurisation was not the end-all and cure. Pasteurisation should be left to the local authorities to decide: those with large populations undoubtedly would opt for it; in the smaller towns and country areas, where little time elapsed before milk reached the consumer, he thought there was no reason for it. The real cure was rigid inspection by veterinary officers, an adequate water supply on farms, and payment on a quality basis.

Mr. Snadden: Speaking for Scotland, he could say he thought producers were not entirely antagonistic to pasteurisation. It did not really matter to the producers in that country whether their milk was pasteurised or not, provided that whoever framed the scheme realised that he must not interfere with their research into animal disease on the one hand, and with the production of tuberculin-tested milk on the other hand. There was the question of what would happen if such a scheme should eliminate the producer-retailer who could not afford the necessary plant. Provided that the T.T. producer was looked after, and that the producer-retailer was either compensated or allowed a certain time to come into the scheme, as was the case in the Milk Bill, then he did not know any producers in Scotland who really cared very much whether the milk was pasteurised or not.

Sir E. Graham-Little: Several speakers had stressed the value of tuberculin-tested herds. Many people had the idea that tuberculosis was the only disease which we had to dread arising from an impure milk supply, but that was not the case. There had been an increase of tuberculosis in the war years, and in some degree that was attributable to milk infected with the bacillus of tuberculosis, but there were at least ten very important diseases which were constantly carried by milk. The next in frequency of occurrence to tuberculosis was undulant fever—Brucella infection. Last year 500 cases were reported, but the cases reported were a mere fraction of those which occurred. It was a very insidious complaint, often mistaken for tuberculosis. There were also a number of other milk-borne diseases: diphtheria, scarlet fever, paratyphoid, typhoid, septic mastitis, summer diarrhoea of children, etc., which were not revealed by the tuberculin test. It was quite illusory to suppose that if you got your milk from a T.T. herd you would be entirely free from the danger of these other diseases. If milk could be sent from the farm to the consumer straight away and the farm was properly supervised there would, of course, be no reason for the pasteurisation of milk, but with the present system of distributing milk, where you had a pool into which milk goes from various sources, it was impossible, whatever precautions you might take in single cases, to keep out one infected sample, and that one infected sample would contaminate the whole pool. Until that system of production and distribution could be remedied pasteurisation was necessary and ought to be compulsory. It did not injure the quality of the milk. It did not destroy its nutritive value, and it did not affect the taste of it to any appreciable extent.

Mr. Mabane, replying to this aspect of the debate, denied that the bulking of T.T. milk was due to the rationalisation of distribution scheme: talking about the thing in total, it was always bulked. They desired in the Ministry to do all they could to encourage the demand for T.T. milk. There was certainly plenty of T.T. milk and more than plenty to meet the demand in general. The hon. Member for Consett (Mr. D. Adams) spoke of pasteurisation, and on one point he must correct him. He suggested that medical officers of health had had taken from them some right to reject milk which previously resided in them. That was not the case.

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Questions

Milk (Pasteurisation)

Mr. David Adams asked the Parliamentary Secretary to the Ministry of Food whether he can now give an assurance that it has been decided by his Ministry that all milk for human consumption shall be scientifically pasteurised, and by efficient handling and transit thereafter to consumers, ensure to the nation a clean, fresh and safe supply of this food.

Mr. Mabane: I am not yet in a position to make a statement on this matter.

Mr. Adams: When will the hon. Gentleman be in a position to make a statement?

Mr. Mabane: I cannot say.

Sir Frank Sanderson: Is the hon. Gentleman aware that there is by no means complete agreement?

Mr. Mabane: That has become apparent.

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Tuberculin-Tested Milk

Major York asked the Parliamentary Secretary to the Ministry of Food whether retail supplies of tuberculin-tested milk are included in the rationalisation of distribution scheme; and whether consumers requiring to change from non-tuberculin-tested milk to tuberculin-tested milk are at liberty to do so providing they can arrange a supply?

The Parliamentary Secretary to the Ministry of Food (Mr. Mabane): The answer to the first part of the Question is in the affirmative. With regard to the second part, consumers may purchase whatever type of milk the supplier with whom they are registered provides, but if he does not provide "T.T." milk they are not permitted to transfer their registrations to another dairyman in order to obtain "T.T." milk. Efforts are being made to encourage and to assist dairymen to provide "T.T." milk for such customers as require it.

Major York: Is the Parliamentary Secretary aware of the despondency his answer will cause, and, further, is he aware that this will wreck the possibility of the extension of supplies of this clean and disease-free milk?

Mr. Mabane: I hope the hon. and gallant Gentleman will do his best to dispel any such despondency. The basis of the scheme is fixed registrations.

Major York: But is the Parliamentary Secretary aware that this milk is different from ordinary milk and that in the past it has been outside normal regulations? Will he reconsider the matter?

Mr. Mabane: We are doing all we can to see that as little "T.T." milk as possible is bulked and that as much as possible is sold as "T.T."

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Agriculture (Post-War Policy)

Mr. Tree asked the Prime Minister when the Government intend to make known their policy in regard to post-war agriculture?

The Deputy Prime Minister (Mr. Attlee): His Majesty's Government have in no way altered their view as to the importance of maintaining a healthy and well balanced agriculture after the war as a permanent feature of national policy. It has not, however, proved possible at this stage of the war for the War Cabinet to carry its consideration of the many problems involved in the formulation of a permanent post-war agricultural policy to a point at which the intentions of the Government can be made known. I am unable to say when that point will be reached.

Mr. TREE: While thanking the right hon. Gentleman for his answer, may I ask whether he is aware that there is considerable anxiety among farmers at the failure of the Government so far to make known their post-war agricultural policy, particularly in view of the fact of the almost unanimous agreement in the recommendations put forward by various agricultural societies in the past few months?

Mr. ATTLEE: I am, of course, aware of the feeling in the agricultural community, and the Government are doing all they can to formulate their views with a view to making a statement as early as possible.

Mr. DE LA BERE: Is the right hon. Gentleman aware that the Government's views never lead to any action, and will he ensure that adequate Government action is taken in the future?

Sir J. LAMB: Can the right hon. Gentleman assure the House and the country that this delay is not caused by any shrinking on the part of the Government in this respect?

Mr. ATTLEE: Certainly.

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LIVESTOCK

Mr. BOOTHBY asked the Minister of Agriculture whether it is the intention of the Government to take special steps to encourage the breeding of pedigree stock in this country?

Mr. HUDSON: The improvement in the general standard of livestock is one of the targets I have set county war agricultural executive committees.

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TUBERCULOSIS

In reply to Mr. J. GRIFFITHS, the Minister of Health gave the number of cases of tuberculosis notified during the past year, and comparable figures for 1938 and 1941, England and Wales, as follows:—

	England and Wales		
Year	*Pulmonary*	*Non-Pulmonary*	*Total*
1938	43,205	14,888	58,093
1941	46,256	13,720	59,976
1942	46,734	13,998	60,732

Dr. RUSSELL THOMAS asked the Minister of Health the percentage increase in the rate per 1,000 living of cases of abdominal tuberculosis in children under 15 years of age in the London area in 1914, as compared with 1938?

Mr. E. BROWN: War-time fluctuations of population do not permit of any precise calculation of such a percentage as my hon. Friend mentions for any year during the war.

Dr. THOMAS: Has not the London County Council medical officer stated in the *British Medical Journal* recently that the rate is 141 per cent. higher than 1938?

Mr. BROWN: Yes, Sir, but this figure was based on assumptions, not detailed in the article, about changes in population. I am not asked for calculations of that kind; I am asked for precise information; and I have given my hon. Friend the answer.

Dr. EDITH SUMMERSKILL: Is the right hon. Gentleman not aware that most of the cases of abdominal tuberculosis are attributable to infected milk?

Dr. THOMAS: Is the right hon. Gentleman aware, too, that milk in London is nearly all pasteurised? How then does he explain the increase?

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NATIONAL STUD

Mr. R. MORGAN asked the Minister of Agriculture whether he can make any statement on the sale of the national stud to the Eire Government?

Mr. T. WILLIAMS: No. Sir. The sale of the National Stud to the Eire Government is not contemplated.

R.C.V.S. ANIMAL MANAGEMENT EXAMINATION

LIST OF SUCCESSFUL CANDIDATES

EDINBURGH:

Allan, Duncan	Currie, R. K.	Shearer, G. C.
Bryson, Wm.	Fletcher. R. B.	Simms, I. H.
Cameron, John	Marshall, P. M.	Singleton, W. B.
Clarke, A. V.	Scott, A. M.	

GLASGOW:

Campbell, R. S. F.	Robertson. J. S.	Torley, J.
Dickie, A. T.	Simpson, Bert	Tosh, James
Frame, James	Smith, Miss A. M.	Wilson, Miss Audrey
McGown, Sydney		

(To be continued)

NOTES AND NEWS

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events

June 2nd.—Meeting of the Editorial Committee, N.V.M.A., at 36, Gordon Square, W.C.1, 2.30 p.m.

June 4th.—Special Meeting of the Yorkshire Division, N.V.M.A., at York, 2.30 p.m.

June 4th.—Meeting of the South Wales Division, N.V.M.A., at Carmarthen, 2 p.m.

June 8th.—**One-hundredth Annual General Meeting of the Royal College of Veterinary Surgeons,** at the Royal Agricultural Society of England, 16, Bedford Square, 11 a.m.

June 8th.—R.C.V.S. Committee Meetings, 16, Bedford Square, W.C.1.

June 8th.—Annual General Meeting of the Victoria Veterinary Benevolent Fund at 16, Bedford Square. immediately following the Annual General Meeting R.C.V.S.

June 9th.—R.C.V.S. Committee Meetings, 16, Bedford Square, W.C.1.

June 10th.—**R.C.V.S.** Committee and **Council** Meetings, 16, Bedford Square, W.C.1.

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R.C.V.S. Annual General Meeting

Owing to the paper shortage it will be impossible to print sufficient copies of the Annual Report to circulate to all members on the Register. Members who wish to receive a copy should send a postcard giving name and address to the Secretary, R.C.V.S., 18, Victoria Avenue, Harrogate.

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PERSONAL

Congratulations will be extended to Mr. Henry Taylor, F.R.C.V.S., on his unanimous election as Chairman of the Cuckfield Urban District Council at the annual meeting held at Oaklands, Haywards Heath, on April 15th.

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Colonial Veterinary Service.—The appointments are announced of Dr. G. N. A. Hall, O.B.E., M.R.C.V.S., as Veterinary Adviser, Sierra Leone and Gambia (jointly); also of Mr. S. B. Kendall, M.R.C.V.S., as Veterinary Officer, Tanganyika.

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Marriage.—STEELE—ABEL.—At Orchardhill Church, Giffnock, on April 28th, 1943, James Steele, M.R.C.V.S., only son of Mr. and the late Mrs. David John Steele of Langside, Glasgow, to Elizabeth Gibb, second daughter of Mr. and the late Mrs. James Abel, Giffnock, Renfrewshire.

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Mr. M. H. Kyaw's Doctorate.—At the meeting of the Board of Research Studies of Cambridge University, held on May 4th, 1943, Mr. M. H. Kyaw B.SC., M.R.C.V.S., of Queen's College, Cambridge, was approved for the Ph.D. Degree. Mr. Kyaw's thesis was entitled "Study of the Immunological Properties of the Pasteurella Group of Organisms with special reference to those infecting Domesticated Animals."

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R.C.V.S. OBITUARY

CLODE, Sydney Bond, Locks Common. Porthcawl, Glam. Graduated Glasgow, December 23rd. 1893. Died May 13th 1943.

RUDD, Thomas William C.B.E., Col. A.V.S. (retd.), Little Tredunnock, Llangarron. Graduated Edinburgh, December 21st, 1894. Died May 11th 1943; aged 73 years.

WEIR, David, Capt. late R.A.V.C. (T.F.), 8, St. Leonards Road, Ayr. Graduated Glasgow, July 27th, 1885. Died May 8th, 1943.

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Mr. David Weir, M.R.C.V.S.

It is with a deep sense of regret that we announce above the death of Mr. David Weir, M.R.C.V.S., of Ayr, which took place early on Saturday morning. the 8th inst., at his residence, after a very short illness. By his passing the South-West of Scotland has lost one of its oldest, most practical and respected veterinary surgeons, whose services were highly valued by a large clientele—by whom and all friends alike he was held in the highest esteem.

Born at Ochiltree. Ayrshire, David Weir served his apprenticeship as a blacksmith—an experience that was to prove a valuable asset to his practical knowledge on the foot of a horse. At the Glasgow Veterinary College he gained many class certificates during his three years' curriculum under the late Principal James McCall, F.R.C.V.S., and was the contemporary of many students who were afterwards to become eminent members of the profession to which he, like them, has been an ornament.

After qualifying on July 27th, 1885, Mr. Weir became assistant

to the late Robert McAdam, M.R.C.V.S., Castle Douglas, in a very wide cattle practice in the Stewartry of Kirkcudbright. Later he returned to the county town of his native area and he set up practice for himself. By dint of hard work, close and assiduous attention to business and the conscientious discharge of his professional duties, he soon built up a first-class practice over a very wide area.

He was keenly interested in agriculture, always progressive, keeping himself abreast of the times. For many years he farmed the lands of Kirkhill, near Auchincruive, prior to Kirkhill being taken over by the Hannah Research Institute. Subsequently he farmed the lands of Broadhead, near Ayr, the tenancy of which he gave up only a short time before his death. He was an enthusiastic member of the Ayrshire Yeomanry and as became his equine tastes he was always "well mounted." During the last war he was on home service and in charge of various veterinary hospitals, and at the close of the war he retired with the rank of Captain R.A.V.C. (T.F.).

Mr. Weir officiated for many years as Veterinary Inspector of the Ayrshire Cattle Section at the annual shows of the Ayrshire Agricultural Association, and for over forty years he was honorary veterinary surgeon at the monthly horse sales, conducted by Messrs. James Craig, Ltd., Ayr—whereat the number of horses that passed through his hands during all these years must be legion. There his figure was a familiar one and on the purchase of horses he had a sound reputation as an adviser. On the question of soundness his probity was ever undoubted—rather than grant a warranty which might in any way prove misleading he preferred to suffer friendships to be severed.

He was the oldest member of the Ayrshire Division of the N.V.M.A.—a regular attender of the divisional meetings, in which he took an active interest. Mr. Weir's long, busy and successful career is the best illustration of his character and his personality—a man of splendid energy of spirit, well read and of fine intelligence, he combined sound sense with strict integrity of purpose, with tact and a cheerfulness of temperament which made him popular and respected by many friends, both in and out of the profession. His advice and his friendship were alike valued. He is survived by his wife, who was a Miss Hood, of Dormiston. Stair, to whom much sympathy is extended in the loss she has sustained. The funeral, which was of a private nature, took place on Monday of last week at Ochiltree Cemetery.

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GENERAL OBITUARY

Sir Thomas Hudson Middleton, F.R.S.

SERVICES TO AGRICULTURE

Sir Thomas Hudson Middleton, K.C.I.E., K.B.E., C.B., D.SC., F.R.S., who died at Whyte House, Strawberry Vale, Twickenham, on May 14th, deserves tribute from the veterinary profession for the distinguished part he played in sponsoring initially the newer developments in veterinary science, both while Assistant Secretary in charge of Education and Research at the Board (now the Ministry) of Agriculture from 1906 onwards and as member of the Royal Commission on Agriculture in India from 1926-28 (specially entrusted with the drafting of the chapter on Animal Husbandry and Veterinary Science), and again as vice-chairman of the Development Commission and later as chairman of the Agricultural Research Council.

A short account of the beginnings of these developments was given in our obituary notice on the late Sir Daniel Hall (*Vet. Rec.* **54**. 303-304), who, as paid Commissioner of the Development Commission, shortly after its inception, framed for that body the draft scheme for a programme of development in veterinary research (including the Veterinary Advisory Scheme). It was especially with the collaboration on the side of the Board of Agriculture of Sir Thomas Middleton that the scheme was put into such shape as to gain official acceptance. With his great wisdom and appreciation of the practical side of research forthcoming from his early experiences in India and in this country, Sir Thomas Middleton worked in the friendliest touch with the late Sir John M'Fadyean and the late Sir Stewart Stockman, who both held the highest regard for the soundness of his views. The institution of the present Veterinary Laboratory of the Ministry of Agriculture was largely the fruit of this sympathetic collaboration, pursued as it was during a critical period under the enlightened President of the Board of Agriculture, Mr. Walter Runciman (now Lord Runciman). Reciprocally, Sir Thomas Middleton entertained the highest regard, from association through over half a century, for the late Sir John M'Fadyean: the opening tribute paid to the latter by Sir Thomas Middleton in the Jubilee number of the *Journal of Comparative Pathology and Therapeutics* at the end of 1937 is evidence of this appreciation, as well as of his lifelong outlook upon the prospects of a wise fostering, in competent hands, of veterinary science.

Sir Thomas Middleton went to India in 1889 to take up the Professorship of Agriculture at Baroda College, remaining there until 1896, when he returned to Great Britain, to the University College of Wales, Aberystwyth, as lecturer in agriculture. Next he became, in 1899, Professor of Agriculture at the Durham College of Science and then in 1902 was elected to the Chair of Agriculture, University of Cambridge. While at Cambridge he engaged in research on the formation of permanent grass from arable land. His work led to the simplification of the practice then in vogue, for he demonstrated the fallacies which underlay the theoretical methods then current of compounding seed mixtures. In 1906 he was appointed Assistant Secretary, Board of Agriculture, and during the next 13 years gave valuable service, especially in the last war, when he took a leading part, as Deputy Director-General, in organising the food production campaign under the direction of Colonel Sir Arthur Lee, M.P. (now Viscount Lee of Fareham), Director-General of Food Production (1917-18).

Not long after the Armistice, Middleton was appointed a member of the Development Commission under the Development and Road Improvement Funds Acts, and continued to serve until 1941, the last 12 years as vice-chairman. He was also, from 1926 to 1928, a member of the Royal Commission on Agriculture in India. When the Royal Agricultural Society instituted in 1933 their gold medal for distinguished service to agriculture, Sir Thomas Middleton was selected to be its first recipient. Three years later he was further honoured by being elected a Fellow of the Royal Society. In 1938 the Committee of the Privy Council for the Organisation and Development of Agricultural Research, after consultation with the members of the Royal Agricultural Research Council and the President of the Royal Society, appointed Middleton to be chairman of the Agricultural Research Council. A few days before the outbreak of the present war he pointed out the effort that would have to be made to increase the country's output of home-grown food. He emphasised the necessity of converting grassland into arable land, and in the years of war which have followed his advice and guidance have been of the utmost value to the nation.

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Roll of Honour

CAPT. JAS. HOWARD THOMAS, R.A.

Deep sympathy will be extended to Major W. Howard Thomas (R.A.V.C. retired) and Mrs. Thomas, 10, Victoria Road, Colchester, who have been officially informed that their only son, Capt. James Howard Thomas, R.A., previously reported missing, was killed in action at Dieppe on August 19th, 1942.

Capt. Thomas, who was 25, entered the Royal Artillery from the R.M.A., Woolwich, in January, 1937. He was among the first troops to land in France in September, 1939, and served in that theatre of war until evacuated from Dunkirk. On his return from Dieppe, Capt. Thomas was to have taken over command of a battery of the Royal Artillery.

This fine young man, whom to know was to love and respect, will be sadly missed by his numerous friends in Colchester and district.

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OXSPRING.—On May 2nd, 1943, at Barrow Hill House, Ashford, Kent, Mabel, wife of Major G. E. Oxspring.

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Errata.—In the paper by Dr. P. S. Watts, "The Practitioner and Mastitis Control under the National Scheme" (*Vet. Rec.* **55**. 175-177, April 17th, 1943), on p. 175, col. 2, line 1, *for* "13 lb. pressure" *read* "13 inches of vacuum"; in the discussion, p. 177, col. 1, ninth line from foot, *for* 60° F. *read* 60° C.

ADVERTISER'S ANNOUNCEMENT

Messrs. Arnold and Sons beg to notify members of the veterinary profession that they are moving away from Tottenham (Standard Works, Lawrence Road, N.15) and that the following new address should be used, commencing from May 22nd, 1943: 54, Wigmore Street, London, W.1.

DISEASES OF ANIMALS ACTS, 1894 TO 1937, AND AGRICULTURE ACT, 1937 (PART IV).

Summary of Returns of Confirmed Outbreaks of Scheduled (Notifiable) Diseases

Period	Anthrax	Foot-and-mouth	Parasitic Mange*	Sheep Scab	Swine Fever
April 1st to 15th, 1943 ...	17	—	1	7	29
Corresponding period in—					
1942 ...	14	—	3	7	13
1941 ...	27	19	1	7	45
1940 ...	23	2	1	10	206
Total Jan. 1st to April 15, 1943	108	10	5	92	168
Corresponding period in—					
1942 ...	95	11	26	98	123
1941 ...	163	195	7	99	599
1940 ...	183	17	11	101	1,126

NOTE.—The figures for the current year are approximate only.
* Excluding outbreaks in Army Horses.

Tuberculosis Order of 1938

The number of bovine animals slaughtered under the Tuberculosis Order of 1938 during the period January 1st to March 31st, 1943, was 3,839.